

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY

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the State Forester's 1960 REPORT



Governor
Edmund G. Brown

Director of Natural
Resources
DeWitt Nelson

1960

ANNUAL REPORT

of the

CALIFORNIA DIVISION OF FORESTRY

F. H. Raymond

State Forester

The State Board of Forestry

Kenneth R. Walker, Chairman
Atherton

W. B. Carter
Lancaster

Paul Aurignac
San Ardo

E. P. Ivory
Dinuba

Kelly B. McGuire
Ft. Bragg

Frank C. Myers
Fallbrook

J. J. Prendergast
Redlands

Director of Natural
Resources
David Nelson

Secretary
Richard G. Brown

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The State Board of Forestry

Kenneth H. Walker, Chairman
Asherton

Kelly B. McArthur
F. J. Bragg

Frank C. Moore
Fairbank

L. J. Pennington
Redlands

W. B. Carter
Lancaster

Paul Anderson
San Ardo

E. F. Ivory
Blythe

COVER PHOTO - Homestake Mine Fire

The Board of Forestry

The California State Board of Forestry held eight regular sessions during 1960. The great bulk of its time was occupied in hearing reports of conditions of a forestry nature and in passing upon Forest Practice Act rules as required by law. At the end of the season separate hearings were held in Northern and Southern California where general reports on the very serious fire season in each general area were presented by the several agencies directly involved in the fire protection problem.

The Board approved the work of its Editorial Committee and ordered printed a booklet titled The Brush Problem on California Livestock Ranges. It affirmed its opposition to the so-called Wilderness Area Bill then pending before Congress. It directed the State Forester to collaborate in an aerial survey to determine insect conditions in the pine region.

On September 30, at the Academy of Sciences in Golden Gate Park an extraordinary session was held to commemorate the 75th anniversary of the California State Board of Forestry. This was the first such commission in the Nation.

Vice Chairman W. B. Carter represented the Board at the Fifth World Forestry Congress held at Seattle, and the Board later formally commended all of the California foresters who had contributed to the success of that elaborate conference.

In July the Board welcomed new members General Frank C. Myers of Fallbrook and Mr. Paul Aurignac of San Ardo. General Myers takes the place of E. Domingo Hardison who represented the agricultural industry, and Mr. Aurignac takes the place of John Baumgartner, Jr. who represented the livestock industry. With this change of membership Kenneth R. Walker was elected to the chairmanship and W. B. Carter was made vice chairman of the Board.

The Fire Season

The year 1960 could well have seen the most devastating record of fire destruction in the history of California if adverse weather alone had been the deciding factor. Actually, all of the wildland fire protection agencies except the U. S. Forest Service established a most remarkable record of small fire losses.

The State Division of Forestry would have established a minimum burned area record had it not been for a single large fire. That was the Weferling Fire which is described in this Report.

The six county fire departments protecting timber and watershed lands succeeded in keeping burned area to less than one-tenth of their

average annual loss. Such a record would have been statistically unusual even during a season of average difficult weather.*

The U. S. Forest Service suffered an unusual number of fires; 2,503 in 1960 as compared with the five-year average of 1,742. Of this total, 872 were man-caused and 1,631 were caused by lightning. In 1960 they lost 194,000 acres as compared to an average 117,500 acres.

In respect to the general inflammability of wildland fuels it was observed that the situation in May of 1960 had already reached a condition of dryness more common to the average month of July in California. Throughout the season the days of "high" fire risk and hazard were about normal, that is, about 45 days. "Very high" and "Extreme" days were two to three times as numerous as during the average season.

The Division forces attended 2868 forest and watershed fires on land where it gives direct protection. These figures show some reduction in comparison with years 1958 and 1959 but they run considerably above the long period averages. One very encouraging statistic was the lowest number of large (over 300 acre) fires in more than a dozen years. There were only 37 such large fires during 1960 in Division territory. Without question this fact accounts for the relatively good record of 1960. It is a statistical axiom among forest firemen that five percent of the fires - the large ones - do 95 percent of the damage in California.**

One remarkable fact of 1960 was that no fatalities occurred as a direct result of fireline action among any persons under Division direction.

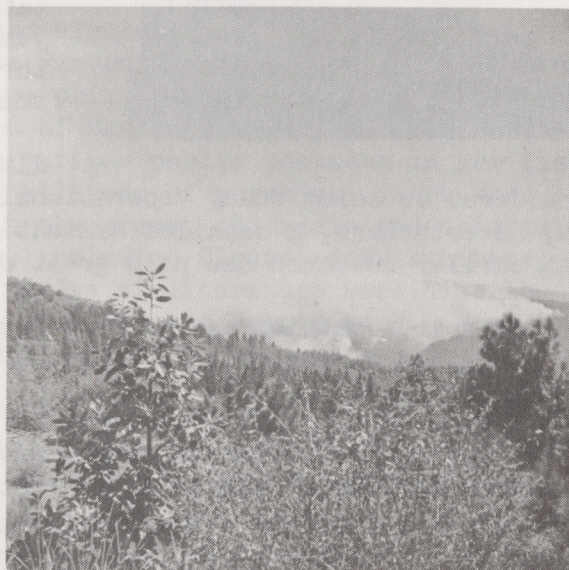
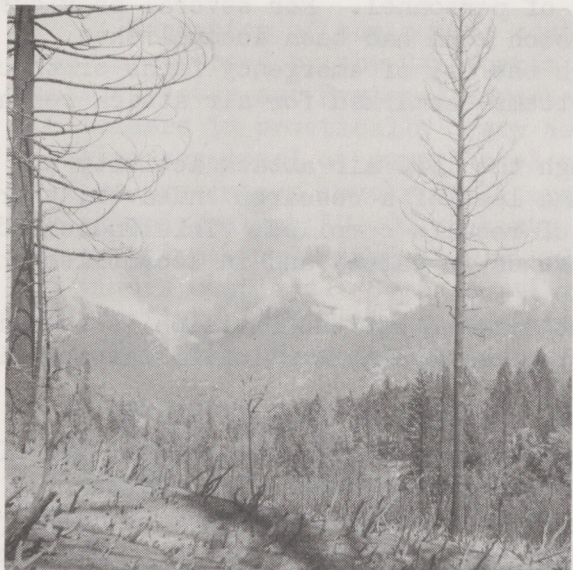
Division Ground Forces

During 1960 there were five bulldozers with their transport trucks added to the vehicle fleet, bringing the Division total to 50 large and 39 medium bulldozer units. Fifty-nine special transport trucks are available to transport bulldozers. There were 454 water-carrying pumper trucks of various sizes in operation, exclusive of a considerable number of pumpers owned by counties or districts and manned under contract by Division drivers in the rural zones. This fleet is further augmented by 685 personnel transportation vehicles of all types, plus 148 miscellaneous firefighting automotive devices. For construction and maintenance work the Division owns some 228 vehicles. Three mobile Conservation Camps consist of 19 trailer units, each developed for some aspect of living or housekeeping accommodations.

*The county fire departments of Los Angeles, Ventura, Santa Barbara, Kern, San Mateo, Marin. For the sake of convenience this group may be referred to in this Report as Contract Counties because they undertake, through reimbursement contract, the State's responsibility for the protection of designated State and privately owned lands.

**More detailed fire statistics for 1960 may be found in the Division of Forestry processed documents "Forest Fire Report - 1960" and "Fire Statistics for 1960 Activities."

The general strength of Division crews for forest-watershed protection was augmented in 1960 by the addition of 12 equipment operators to handle the new bulldozers. There were in total: 363 foremen (plus 35 who worked as patrolmen); 247 drivers; 110 equipment operators (plus 29 assigned to Conservation Camp heavy equipment). There were 1160 seasonal firefighters assigned to 230 stations; 208 camp cooks; and 124 lookout observers to fully man 82 State lookouts. In addition there was the considerable manpower available from Conservation Camps as described later.



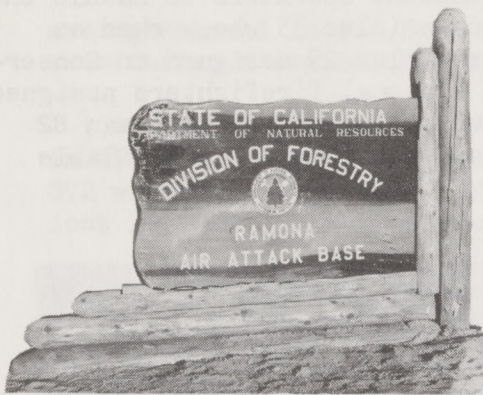
1960 FIRE STATISTICS

Timber and Watershed Fires on STATE and PRIVATE Lands (Does not include structure and vehicle fires)

<u>Agency</u>	<u>Acres Protected</u>	<u>No. Fires</u>	<u>Acres Burned</u>	
			<u>Timber</u>	<u>Watershed</u>
Division	25,928,435	2,868	11,776	107,229
U. S. F. S.	4,778,836	532	19,612	11,699
Hoopa Res.	1,033	8	-	2
Los Angeles County	626,812	131	1	1,246
Ventura County	385,190	79	-	89
Santa Barbara County	742,500	91	-	596
Kern County	2,177,255	76	-	575
San Mateo County	199,810	28	-	56
Marin County	298,190	105	5	336
	35,138,061	3,918	31,394	121,828

Division of Forestry Action on Fires

Forest and Watershed Fires Attended	2,868
Structural type fires in forest-watershed zone	1,854
Rural zone under Division protection	5,971
Fires attended in USFS border area	200
City fires attended by rural CDF crews	711
False Alarm runs	1,672
Miscellaneous emergency calls	55
	13,331



Aircraft Attack

During 1960 the Division was authorized to budget funds to the extent of \$280,000 and to enter contracts with aircraft operators to drop chemicals on forest and watershed fires, and for fire detection and transportation of personnel. For several previous years such work had been accomplished through the use of emergency funds or through small items earmarked for air attack research.

Although the 1960 air attack activity was considered as being fully "operational" and less of a research endeavor, there was, nevertheless, a detailed evaluation of results compiled. This indicated that earlier research had paid great dividends in safety and in accomplishment.

Borate solution was used to a great extent, but the Division is becoming more inclined to recommend a solution of bentonite clay for initial attack fire suppression from the air.

During the season 164 fires were attacked by fixed wing tankers and 20 by a "helitack" crew stationed at Pratt Lookout in southern Humboldt County. This crew consisted of a foreman and three firefighters assigned to a turbo-jet Allouette helicopter which stood by for fire calls during the months of August and September.

The helicopter spent 57 hours in the air, of which time 18-3/4 hours was on actual fire attack with most of the remainder being fire observation and transport of crews. It happened that fewer fires occurred in this region than long records had indicated. Nevertheless, very valuable work was accomplished on eleven fires. In total, the helicopter crew system was deemed a highly satisfactory fire control technique.



A batch mixer used to prepare liquid fire retardants for direct loading into attack aircraft. Loma Rica airport.

EDUCATION AND LAW ENFORCEMENT

In-service training of Division personnel involved 249,000 student hours, of which more than half was devoted to seasonal fire crew personnel. Instruction required 32,000 hours of personnel time. At the two Division Training Centers 100 Drivers and 20 Foremen passed through a concentrated 5-week program.

Education of the public continued vigorously within the general program endorsed by the California Fire Prevention Committee, of which the State Forester and Regional Forester are principal members in company with 400 leaders in practically every aspect of business and social life. Division personnel at every level made various public contacts in the field of fire prevention involving literally millions of persons. There were, for example, about 10,000 contacts with the press, 433 radio and television presentations, more than 1200 displays, including floats, fair exhibits, and window displays. Some 2½ million pieces of literature were distributed by field forces and an additional 7 million to cooperators. More than 2000 film presentations were made.

Division patrolmen made 67,000 personal contacts with citizens during their patrols, and of course, thousands of people called at Division offices. There were, for example, 116,283 permits issued to burn trash and debris, exclusive of range improvement burns.

Of the timber-watershed fires attended by Division crews, it is noted that 35 per cent originated along roadways, and nearly six percent along railroads. This was in spite of the fact that some 2000 miles of highway and roadways were fireproofed as well as 270 miles of railroad.

Enforcement of forest and fire laws was given increased emphasis in 1960. Field officers were given special training in policies and procedures and an assistant was placed with the Division Law Enforcement Coordinator. Of fires attended by Division forces, approximately 2500 forest fires on State Responsibility areas protected by the Division were investigated for criminal or civil liability and an additional approximate 5500 fires on areas of Local Responsibility. Convictions in 216 cases were secured. Of 2,485 potential civil liability cases, 684 were brought before review and a sum of nearly \$200,000 demanded as reimbursement for suppression costs. Conformance with Forest Practice Rules on the part of lumber operators is being regarded with increasing firmness.

Legislation

There were no legislative changes in 1960 which will affect the Division of Forestry. In Los Angeles County the Board of Supervisors passed a so-called Water Ordinance which is designed "to promote and obtain a reasonable minimum level of fire protection performance for water supply facilities ... to serve new subdivisions ... in the unincorporated area ..." Within this ordinance is the provision that a builder must possess a certificate from the County Forester and Firewarden to the effect that local private water sources are adequate in the event that the County Engineer does not certify as to the existence of otherwise satisfactory sources. The Fire Warden is also made a party to the approval of plans submitted for the construction of water systems in respect to their fire protection adequacy.



Installing a Mobile
Camp at Mtn. Home

CONSERVATION CAMPS

1960 witnessed a considerable expansion in the Conservation Camp Program which is conducted jointly by the Division of Forestry with the Department of Corrections for adult inmates and the Youth Authority for youthful wards of the State.

Three new permanent 30-man camps were opened. These were Pilot Rock, Plum Creek, and Mountain Home. The latter had been a small summer camp for several years. In addition, three unique Mobile Camps each housing 40 inmates were established in areas where isolated or short-term projects would not justify the considerable expense of permanent camp construction.

These additions brought to 30 the number of conservation camp units where work is supervised by the Division of Forestry. A total of 2005 inmate workers (including 265 youthful wards) were residing in these camps by the end of the year. Four additional camps were under construction at that time.

Other than the inestimable value of rehabilitation of the workers it can be reported that the total construction, maintenance, and fire control work of these camp residents totaled some 4,650,000 man-hours during 1960. Of this labor, a total of 423,400 hours was expended in fighting forest fires.



Typical work assignments for
Conservation Camp crews under
Division supervision



DIVISION OF FORESTRY BUDGET
Fiscal Year 1960-61

(1)	General Support	\$ 18,836,624
(2)	For other agencies protecting State and private State Responsibility Land	2,336,362
(3)	Emergency Fire Fund	730,000
(4)	Blister Rust Control	94,866
(5)	Insect Control	20,000
(6)	Forestry and Fire Research	<u>298,817</u>
(7)	Total above	\$ 22,316,669
(8)	Capital Outlay	5,708,477

Explanation of above budget:

- (1) \$716,000 increase over prior year due to salary increase. The total increase would have been greater except that a 2.2% reduction of all State budgets under Executive demand was subsequently effected by the Division of Forestry.
- (2) To Kern, \$329,175; Los Angeles, \$448,889; Marin, \$104,288; San Mateo, \$100,589; Santa Barbara, \$159,956; Ventura, \$165,312; U.S.F.S., \$1,028,153. (see footnote, page 2 of this Report).
- (3) Depends upon length and severity of fire season.
- (4) Paid to U.S.F.S. in matching expenditures for field projects.
- (5) To be expended in approved cooperative abatement projects in areas of serious infestation.
- (6) Includes \$110,581 soil-vegetation mapping; \$23,472 to San Dimas.
- (7) Includes federal aid paid into State Treasury of \$1,148,000. Also includes \$405,442 reimbursement from U.S.D.I. for protection of scattered public domain of some 3.6 million acres. Does not include over \$2 million reimbursement by 24 counties for rural-structural protection. Does not include \$548,222 paid into General Fund as income from nurseries and State Forest products.
- (8) Funds expendable during 3-year period. Includes \$4,207,235 earmarked for conservation camp construction.



Contract airplane taking cargo of 800 pounds of annual rye grass seed for sowing part of Weferling Burn. Helicopters are also used for seeding.



Marden Brush Cutter being used to chop and beat brush into the soil at Ranchita Range Study, San Luis Obispo Co.



The Dal Tool in use. Invented by Assistant State Forest Ranger Norman Dal Porto to cut "frills" into the sapwood of undesired trees. Chemicals poured in cupped notches destroy sprouting capability of oaks and other species on range land.

Emergency Revegetation of Denuded Watersheds

During 1960 the Division furnished technical guidance, arranged for seeding, and cooperated with private landowners and with the Federal and local governments to accomplish emergency revegetation of more than 34,000 acres of watersheds denuded by wildfire. This emergency revegetation is accomplished by broadcast seeding of fast-growing annual grass. Sprouting grass - if it appears soon enough - will materially reduce erosion and flood runoff on critical watersheds during rainstorms.

The State bears up to 50 percent of the cost for revegetation work on qualified private lands. Federal agencies assume full cost on Federal land. The Division was financially involved in 12 projects, sharing the cost for seeding 16,530 acres of private land during 1960. This program cost the State an average of 60 cents per acre seeded, a total of \$9,962. As in past years, most of the projects were in Southern California.

Division personnel, with the cooperation of the Pleasanton Plant Materials Center, established seed plots on three burned areas in order to gain more knowledge regarding the performance of the commonly used plants and to evaluate some relatively untried species. A summary of data collected for three years on several earlier projects was published during 1960.

Range Improvement

The Division assisted range land owners in many ways during 1960: with advice on the ground, by issuing burning permits, by conducting demonstration projects and through special publications. Division personnel provided advisory service to almost 600 ranchers, helping them solve their controlled burning, grazing management and other problems of brush range improvement.

Permits, with recommendations regarding how to burn safely, were issued to 451 individuals. These owners of range land burned 128,430 acres of brush and other low value vegetation during 1960. Of this area 35,006 acres were seeded. An additional 4,755 acres were burned by fire that escaped control. Special and regular Division fire crews aided permittees during emergencies by providing added protection for adjacent property owners during the burning of approximately 100,000 acres.

Many demonstrations and tours were conducted upon the Division's brush range improvement study projects throughout the State. Generally these studies are undertaken cooperatively by the Division with agricultural specialists and the owners of the land. The knowledge and techniques developed from these projects are made further available to the public in special Division publications. During 1960 publications were distributed dealing with the treatment of chamise, pelleted brush roughage, a special tool for controlling hardwoods, aircraft spraying, the brush problem, and brush range improvement.

Advisory service to ranchers is furnished by eight specialists in range management employed by the Division at its field district offices.

Nurseries and Reforestation

During the past decade the distribution of planting stock from the Division's four nurseries has risen from a quarter million to four million trees. In respect to the area needing planting this is not so remarkable in total as it is in the increasing trend of interest among private landowners.

The devastation of good forest sites by fire during the past several years, coupled with a demonstrated success in the survival of plantations, has caused a heartening reforestation effort.

Approximately 55 percent of Division planting stock distributed in 1960 was used to plant private timberland. In total, all types of owners planting for reforestation purposes accounted for 83 percent of stock distributed. The remainder was for planting of public grounds and for erosion control on private lands.

There were over 7,000 acres of State and private land planted to forest trees during 1960, of which 6,885 acres were privately owned. Almost half of the area was seeded and that was in the northwest part of the State.

Recent observations give substantial evidence that only careful planting and preparation of planting sites will assure an acceptable degree of success. For example, it appears that competition from brush and other low species on logged or burned land is a vital factor affecting the survival of tree seeds or seedlings. For example, complete clearing of the land by bulldozers has produced better results than where brush was smashed down and burned. At any rate, experience in reforestation methods has increased survival of timber plantations in California from about 30 to 60 percent at the present time.

Five reforestation studies in cooperation with the landowners are now being conducted by the Division in Sonoma, Butte, Calaveras and Amador counties.

The Advisory Committee to the State Forester on Reforestation Methods and Procedures met twice during the year. This is an honorary group of ten men representing all aspects of industry and the profession of forestry. One of their recommendations to the State Forester was that the Division maintain the production of high quality planting stock in its nursery program.

Acquisition of enough good seed has been especially difficult during the past four seasons. Some 1,700 pounds of seed was collected last fall. This work is, incidentally, materially aided by Conservation Camp workers. It appears obvious that the Division will have to take advantage of heavy seed years to build up extra supplies.

State highway encroachment made a considerable relocation of buildings necessary at the Davis Nursery. A new metal structure for administration and plant propagation was erected. Production of stock at Davis was substantially reduced because of the reconstruction work.



Davis Nursery; 1960



Little Beaver Planting Auger
Gualala Reforestation Study

The Forest Practice Act

Considerable loss of merchantable timber and potential growth occurred on timber lands in California from forest fires in 1959 and 1960. The impact of these fires had a great effect on logging operations. Many operations shifted from green timber to black timber in order to expedite the salvage of fire-killed trees. An accelerated program under the promotion of the California Forest Pest Control Action Council of salvaging bug-infested timber and trees susceptible to attack was initiated in 1960 to aid in the control of bark beetles.

There were many changes in required logging practices because of amendments in Forest Practice Rules proposed by Forest Practice Committees of the North and South Sierra Forest Districts and approved by the State Board of Forestry. The determinations made in this respect by Coast Range Pine and Fir Forest Practice Committee after several public hearings will be presented to the Board early in 1961.

With 374 timber operator permits issued, and 329 deemed expired, there remained at the end of 1960 a total of 2105 valid permits. This represents a small increase over 1959, although not all permittees engaged in operations. Less than 1600 were actively operating as indicated by notices filed with the State Forester. This was somewhat fewer than the previous year and it probably reflects the depressed condition of the lumber market. These operators reported that they harvested 5.89 billion board feet of timber in 1959.

During the year 2,496 inspections were made of timber operations. In total, 1,839 infractions of rules were observed. Of these, a fourth were in respect to failure to dispose of snags. On the other hand, statewide, 87 percent of all rules inspected were found to be in compliance in 1960.

Mindful of the determination of the Board of Forestry to take vigorous enforcement action, the Division sent 1,360 violation notices to timber operators. The permit of one timber operator was revoked for failure to comply with the rules and he was placed on probation pending corrective action by tree planting to restock the area. In addition, many personal and written contacts were made with operators in order to improve compliance with the rules and related laws. Seven cases of fire law violations by timber operators were filed and all were sustained in court. One case involving operations without a proper permit was pending in court at the year's end. Also at the close of the year, 17 litigation reports were with the State Attorney General for prosecution against persistent violators of Forest Practice Rules. Seven similar cases were dropped when offenders corrected the violations. Ten other litigation cases were being prepared by the Division at the end of 1960 or under investigation before being submitted to the Attorney General.

A number of appointments to the Forest Practice Committees were made during 1960 by the Governor. These were John G. Miles vice Gordon Manary on the Redwood Committee, William L. Gray vice Alvin Haynes and William Holmes vice Delbert Schiffner on the North Sierra Committee, Seth Beach vice Alfred Hildman and Chas. R. Tayles vice Roy Cullers on the South Sierra Committee, and Albert Fearrien vice Stewart Ralston and Harold R. Crane, Jr. vice C. J. Fairhurst on the Coast Range Pine and Fir Committee.

Under the Forest Practice Act, 110 owners filed affidavits to convert 40,754 acres of timberland to other use. Some 88% of the acreage was for grazing purposes. Ten alternate plans were approved by the Board of Forestry in 1960 to allow deviation from the Forest Practice Rules.

Timber Taxation

The timber maturity board (authorized by Article XIII of the State Constitution) acted in Mendocino and Humboldt counties during 1960. In addition to the County Assessor this board is composed of a representative from the State Board of Equalization and the Board of Forestry. Kelly B. McGuire, assisted by the headquarters staff of the Division, represented the Board of Forestry in these matters.

Young-growth timber on 32 properties consisting of 18,585 acres were declared mature for assessment purposes. Since 1955 the cumulative total embraces 217 properties involving 140,017 acres subject to timber taxation.

The joint timber taxation study committee appointed by the Board of Equalization and Board of Forestry in 1957 made substantial progress during the year. This committee is presently composed of three County Assessors, a member of the Board of Equalization, the Dean of the School of Forestry (chairman), and three members of the Board of Forestry--Kenneth R. Walker, E. P. Ivory, and Kelly B. McGuire. The committee initiated a pilot study of timber taxation in Mendocino County in 1958. The study is financed by the Board of Equalization, the County Assessors Association, and the timber industry. Investigative work was contracted to the School of Forestry and largely completed in late 1960. A report will be published in mid-1961.



Salvage logging in
"black timber"
Ice House Burn in
El Dorado County.

Forest Pest Control

Material and aesthetic losses due to insects, disease and animals in the forest may not be so spectacular as that caused by fire, but there is no doubt that in total the loss from such causes exceeds fire damage.

The California Forest Pest Control Action Council is a representative association of foresters and interested representatives of government and industry. It acts to coordinate the work of investigation and abatement of forest pests.

Because of critical insect infestations in the Sierra an emergency meeting of the Council in March proposed that there be delineated and declared a total zoning of more than $7\frac{1}{4}$ million acres. An aerial survey, augmented by ground surveys and appraisals of insect conditions was undertaken by the Division, the Forest Service, National Park Service and Pacific Southwest Forest and Range Experiment station. Representations by the Council before the Board of Forestry and State Forester resulted in the largest declaration of insect infestation zones yet on record. Four such zones, including land from Siskiyou to Fresno counties embrace an area of 7,275,580 acres.



Deer browsed redwood sprouts
Humboldt County

Division personnel submitted detection reports on 318 cases of pest damage as compared with 144 in 1959. There was also an apparent new infestation of spruce budworm reported. The improved breeding grounds made possible by extensive burned areas and cumulative drought are, of course, the obvious reasons for increased forest insect depredations.



Field testing Lindane spray
in standing and felled in-
fested trees to control
western pine beetle.
Shasta County.

The Division participated in 10 direct insect control projects over some 74,000 acres and made expenditures of \$44,464 for work on non-federal land. Cooperators expended 50 percent or more of the cost in all cases except upon State owned land. Conservation Camp crews were used to fine advantage in much of this work. On one project near Hat Creek, field testing of application of the chemical lindane was undertaken.

Control of white pine blister rust is being concentrated on less than a half million acres of the 2.2 million on which sugar pine grows, and then only if owners indicate a material interest in the work. Nevertheless, the State through contracts with the Forest Service expended nearly \$90,000 during 1960 for cooperative control work on 64,019 acres of private lands and for direct control on 5,000 acres of State lands. Conservation Camps were used where it was convenient. The control method used consisted of the eradication of the host ribes plant. However, the Division in cooperation with the Pacific Southwest Forest and Range Experiment Station, began testing a new antibiotic called Acti-dione which apparently will be effective in destroying blister rust cankers when application is made directly to infected young trees. Also, a cooperative nursery experiment conducted with the Forest Service hopes to produce rust resistant sugar pine planting stock.

Two new cooperative projects involving disease control were initiated with the University Department of Plant Pathology. These were concerned with dwarf mistletoe and the mysterious "X" disease of pines.

Division personnel were also actively interested in animal damage to young trees. Porcupine, bear, deer and rodents are especially destructive in some places. A new cooperative investigation of rodent control was initiated with the U. C. Department of Zoology at Davis.

Service Forestry

Provident management of forested land in small ownerships is the primary aim of the Division's service forestry program. Ten professional foresters employed by the Division provide management advice and assistance to the owners of small forest holdings. These men are located throughout the important timber growing areas of the State. They represent this State's part of the Federal cooperative forest management grant-in-aid program.

The last national survey of the condition of forest lands showed that the status of management on small forest properties was markedly low in quality and these small ownerships in the aggregate contain a vast amount of the nation's prime timberland. More than one-third of the private commercial timberland in California is in small tracts owned by tens of thousands of individuals. If the timber needed for the future is to be produced a large share of it must come from these lands. Improved management of these properties should be undertaken without delay. Management of a forest property requires technical knowledge and professional skill which most small forest owners do not possess.

Service foresters furnish knowledge and skills by assisting the owners of these small tracts. They help the owner develop management and cutting plans and show him how to benefit from scientific forestry practices. The owner is shown the details of improved woods practices that he can accomplish himself. For large properties, and where timber sales involving a considerable cash return are involved the owner is encouraged to employ a private consulting forester.

During 1960 Division Service Foresters received nearly 1900 requests for assistance. Some 1600 owners of 220,500 acres of forest were assisted with their forest management problems. Improved management practices were followed by 434 owners. This involved 2,781 acres of timber stand improvement, 1,290 acres of pruning and over 4,600 acres of planting and seeding. Nearly 25,000 acres of young timber were saved from premature harvest by owners who followed the professional advice of the service foresters. Improved practices were followed in the harvest of over 48 million board feet of timber and other forest products with a stumpage value of one million dollars. Ninety-four owners were encouraged to retain consulting foresters or obtain the services of industrial foresters.

Cooperation with other conservation agencies is essential to the success of service forestry. The service foresters are responsible for technical assistance to farmers under the Federal Agricultural Conservation Program, which provides cost-shares to farmers for forest tree planting and timber stand improvement work. The Division entered into agreements with 25 county Agricultural Stabilization Committees to allow the State to recover some of the costs incurred in providing these technical services to landowners.

Close working relationship has been maintained with the University's Agricultural Extension Service, Soil Conservation Districts,

and the Small Woodlands Council. The latter is an association of public and private parties having the purpose of encouraging good management of small forest properties.



Service Forester and landowner inspecting a successful tree plantation.

State Forests

State Forests are lands acquired by State Government and dedicated to forestry purposes under competent management. The first material acquisition of State Forest area followed enabling legislation and appropriations of 1945 and 1946. Currently there are 70,238 acres of State Forests in eight units, only four of which are significant timber producers.

Timber sales on State Forests in 1960 consisted of 27.486 million board feet of timber together with other products which brought \$875,448 to the General Fund. The sales program was sustained at the level of the planned allowable cut for each forest. Timber sale transactions included six large sales and nearly 100 small sales. Since 1946 the sale of forest products has returned \$4.345 million dollars to the State.

The primary objective of State management of these Forests is investigation and demonstration of improved forestry methods. Harvesting of forest products is conducted in accordance with various plans and techniques designed to accomplish certain goals or to increase our scientific knowledge.

Most of the logging was done in overmature stands in order to remove trees which are no longer producing an appreciable annual growth increment. This selection of marked trees increases the growth capacity of residual thrifty young trees. However, some young timber was also logged for the purpose of testing silvicultural and logging theories in various mixtures of species and by various methods. For example: on the Jackson State Forest a light selection and a heavy tree selection cutting was accomplished this year. A small clear-cut was prepared for commercial sale next year. These studies with another study which consisted of a

group selection system in 1959 should provide valuable information that can lead to a better understanding of the best methods of managing young-growth timber in the Redwood Region.

More than 360 new test and record plots were established during the year. Thinning, limb pruning, volume and growth measurements, planting, seeding, removal of competitive vegetation, and other studies were continued and initiated. The publication of two bulletins and five "Forest Notes" which were compiled by the supervisors and specialists of the State Forest system during the year indicates that reportable results are indeed beginning to develop in the Division's forest management investigations.

The increasing impact of recreation seekers made it necessary to improve and fireproof camping areas, establish patrols during critical times and eliminate hazardous vegetation along traveled roads. There was also attention given to removing old logging debris accumulations in salmon streams and preventing such damage in current lumbering operations on the State Forests.

Research and Development

The sum of \$164,764 was made available to the Division for research and development during 1960-61, in addition to \$23,472 which was allotted to San Dimas Forest and \$110,581 for soil-vegetation mapping. Much of this investigative work was performed in cooperation with other agencies.

Through contracts the University of California was able to continue work on fire protection economics, forest growth prediction, seed tree effectiveness, value and treatment of California hardwoods, planting stock physiology, and bark beetle control. New projects undertaken in 1960 involved control of forest rodents, dwarf mistletoe, and "X" disease.

Through contracts with the Division, assistance was furnished to the Pacific Southwest Forest and Range Experiment Station to continue research in fire prevention, lightning control, fire climate, fuel break, interception of water by herbaceous vegetation, and management of brush watersheds. The latter two projects are centered at San Dimas Experimental Forest. The others will be mentioned again.

A number of publications resulted from this research work. They are listed at the end of this Report.

The cooperative investigation of the relationship of weather to the risk of fires starting and spreading was continued during 1960.

One addition in applied techniques became available with the installation of radar tracking equipment at the Sacramento Weather Bureau. Through radar readings the Division Fire Control Section obtained information regarding electrical storm conditions along the Sierra and Coast Range for a distance of 220 miles from Sacramento. Division field stations, after being forewarned of the position and probable movements of

cumulus cloud pillars, entered the program by making close field observations of ground conditions, and especially lightning activity in the designated areas.

It is hoped that this project will eventually furnish enough practical knowledge about the behavior and prediction of lightning activity to offset the negative results thus far encountered by the Division in its cloud nucleation work. Experiments in cloud seeding from ground based generators to dissipate electrical tensions appear to have been ineffective for the most part.

Another aspect of fire-weather investigation has been the development of a so-called Normal Fire Load Index and from it a Seasonal Severity Index. In simple terms this will mean that at any time throughout a fire season there can be established a relative condition or possibility of fires igniting and then spreading at a certain rate in any given place and fuel type. It will also be possible to predict such conditions as they will prevail throughout the season.

Such research is closely related to the fire climate study being undertaken by the Forest and Range Experiment Station with the aid of \$20,000 from the Division budget. This research involves local weather patterns and their effect upon running fires. Such local phenomena as canyon winds, inversion blankets of air, and local air turbulence have long been recognized as critical factors in firefighting, but there remains much to be learned about their causes and habits.

Somewhat related is the research project known as Fuel Break. The Division contributes \$16,000 annually to this study in which the Experiment Station, the University, the Forest Service and Los Angeles County also participate. The principle objective is to prepare and test methods of segregating highly inflammable brush fuels into manageable units from a fire control standpoint. Integrated with this is the precise observation of inflammability of various plant species (including exotics) at various sites and seasons.

Working with a relatively small budget, Division personnel were nevertheless able to make a few valuable contributions in fire control tools. Moving pictures were taken of "going" fires for the purpose of studying fire behavior and to use them in training fire managers and crews.

Tests were made on various heat resistant materials to develop something that will protect firefighters trapped in flames. An aluminized blanket appears to offer protection under which a man could survive as long as four minutes surrounded by the most severe heat to be anticipated. Some of the cloth material has been acquired for placement on bulldozers.

A hydraulics slide rule was developed somewhat after municipal fire department types. It is hoped to have this working tool available soon to guide Division truck operators and fire bosses in complicated hose lays and relay pumping lifts.

Another device constructed in the pilot stage is a mixer and agitator for measuring chemicals and water which compose the "slurries" of fire retardant solutions dropped by aircraft on fires. Considerable accuracy and speed required in the preparation of large batches of solution indicate the need for a tough, simple and dependable device of this sort.

The Division in cooperation with the Forest Service engaged in a small but very practical experiment in the ground delivery of several retardant solutions by selected pumper trucks. Borate, bentonite foam, and algin were sprayed on different types of fires throughout the season. Some decisions as to value of materials have been made. However, the more promising treatments will undergo further practical observations during 1961.

Soil-Vegetation Survey

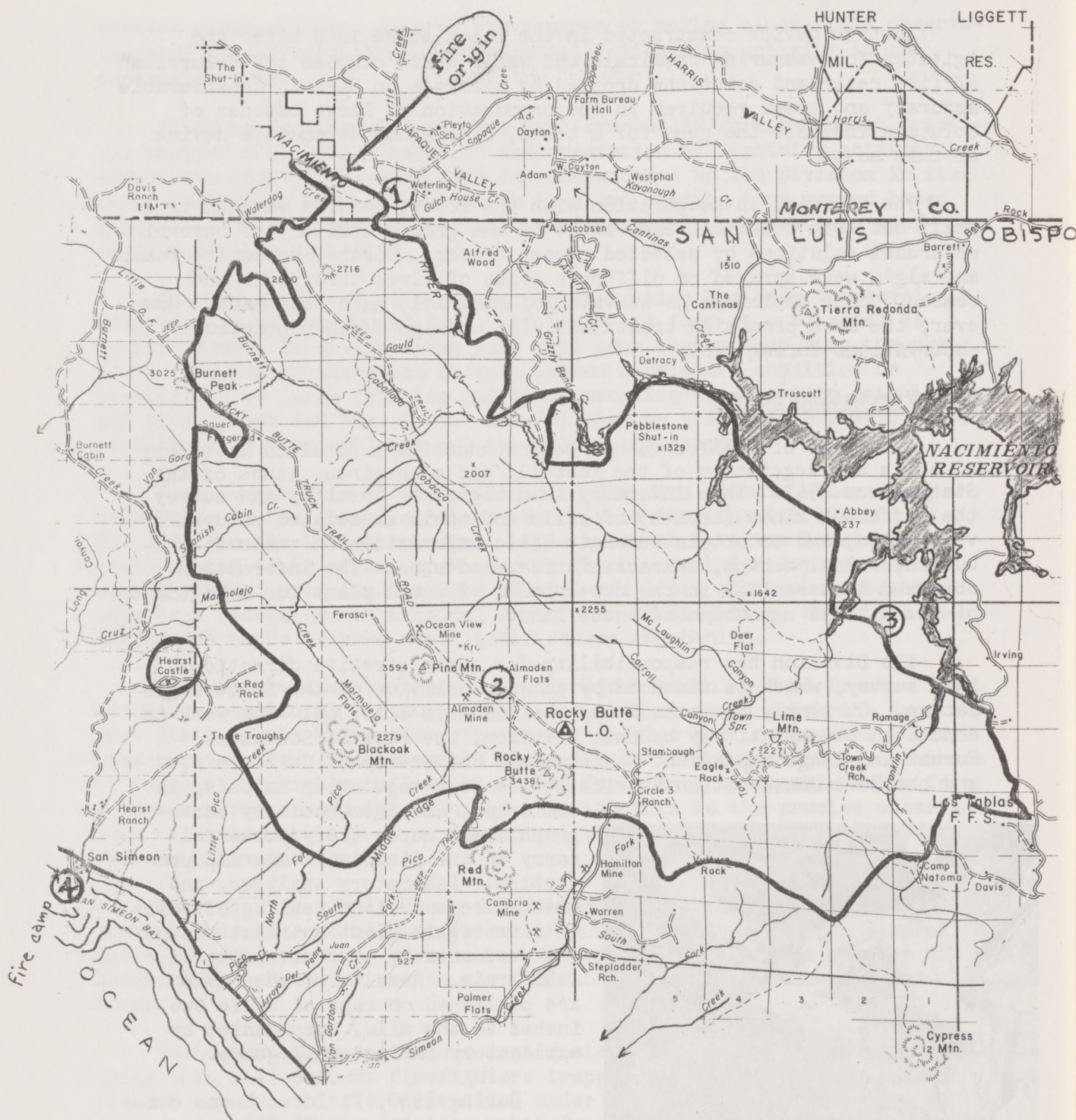
The State of California has been conducting a detailed inventory of soils and vegetation of the foothill and mountainous lands of the State since 1947. This inventory is designed to identify and survey the different kinds (series) of soils and their associated natural vegetation, and to obtain accurate basic information on their distribution, relationships, characteristics, and uses. The information obtained is essential in the development of sound plans for management of the natural resources of these lands.

The Division has responsibility for administrative direction of this survey, which is financed by an appropriation of the State Legislature. Currently the annual appropriation is \$113,068. The work is conducted co-operatively by this Division, the Pacific Southwest Forest and Range Experiment Station, the University of California, and the Soil Conservation Service. Five soil-vegetation mappers, in

two crews, and the necessary cartographic and supervisory personnel carry on the field work and map production. Laboratory analyses, and greenhouse and field testing of soils to investigate plant nutrient status are performed by the University of California. Results of the survey are published on maps at scale two inches to the mile, accompanied by explanatory tables and legends.



During 1960, field work was completed on a total of 421,000 acres: 201,000 acres in Humboldt County, and 220,000 acres in Shasta County. Personnel of the Soil Conservation Service mapped 34,000 acres of the area completed in Shasta County. Maps giving soils and vegetation information on 500,000 acres were published during the year.



WEFERLING FIRE

THE WEFERLING FIRE

July 17 - 25, 1960

Extending northward from the Los Osos Valley, near San Luis Obispo, along California's Central Coast to Monterey Bay, the Santa Lucia Range rises abruptly from the Pacific Ocean. This effective mountain barrier inhibits the inland flow of cooling marine air except for short distances up coastal streams and gulches. There is seldom found anywhere a more varied vegetation cover type. Moisture loving redwoods and succulent plants are to be seen along coastal stream courses within a hundred feet of such drought resistant plants as yucca and the chaparral species.

Sunday, July 17, 1960, found Lookout Charlie Myers at his usual post, in the California Division of Forestry's Calandra Lookout on the inland side of the Santa Lucias in southern Monterey County.* This was the third day of a scorching hot spell and today's 97° afternoon temperature (in spite of the 2800' elevation) indicated another day of high fire risk. Charlie consoled himself with the thought that 97° was cooler than the 110° in the Weferling Ranch country.

At approximately one o'clock a group of picnickers had finished lunch along the Nacimiento River and were preparing to leave the area. While the exact cause has not been established, a reasonable assumption envisions a carelessly discarded cigarette left unnoticed as some harassed father attempted to herd his brood into the car.

It was shortly after 2 p.m. when Charlie called the Monterey Ranger Unit Headquarters at King City and reported smoke in the center of the Santa Lucias along the Nacimiento River on the Weferling Ranch about 10 miles from his station.

Assistant Ranger Eugene Tarp, and the Lockwood fire crew, and other crews from Monterey and San Luis Obispo Ranger Units were immediately dispatched. Upon their arrival they were confronted with some 40 acres of rapidly spreading fire. Additional help was requested and a flanking suppression action begun. Three hours later it appeared that the initial attack forces, along with air tankers and follow-up crews, would be successful and that final control would be effected during the "first burning period" with a loss of 200 to 300 acres.

Around 6:30 p.m. Sunday night plans for backfiring operations were being completed and equipment was being moved into place. But then the curse of all firefighters blew in from the north in the form of erratic dry winds. Control lines not yet backfired were engulfed in minutes; men and equipment temporarily pulled back to safety zones, and the fire spread to the south into Gould Creek and Little Burnett Creek.

Associate Ranger Bawcom, who had arrived within a quarter hour of the first forces and had assumed Fire Boss responsibilities, now had a campaign fire on his hands. He decided to withdraw his forces to the Nacimiento River, backfire from the river in a southerly direction to the confluence of Little

*Calandra Lookout was named as a memorial to Assistant Ranger Joe Calandra who lost his life in the Santa Lucia Fire of 1939. And incidentally, Assistant Ranger Paul J. Nesgis died on a fire of 1945 within a few hundred feet of Calandra Lookout.

Burnett Creek, pivot at this junction, bring the firing operations up Little Burnett Creek and eventually tie back to the Nacimiento in the Waterdog Creek area.

Meanwhile, Ranger James Dulitz of the San Luis Obispo Ranger Unit, as a precautionary move, ordered men and bulldozers onto the Rocky Butte Truck Trail to widen and strengthen it.

At 7:00 a.m. on the 18th, backfiring operations had proceeded satisfactorily down the Nacimiento and up Little Burnett Creek as far as Tobacco Creek. A small spot fire ahead of the main fire to the south of Little Burnett was discovered and extinguished during the early morning. At this time an extremely resistant inversion layer of hot air caused smoke to blanket the topography, seriously interfering with visibility and forcing the grounding of all fire control aircraft. During the early afternoon of the same day, the inversion layer was punctured with a boiling smoke column in the Tobacco Creek drainage. This was from an undetected spot fire going wild with a supply of fresh air. Large twin-rotor Army helicopters were used to carry hand crews into inaccessible areas of the Tobacco Creek drainage in a matter of ten minutes. Normally it would have required six hours by automobile and foot to reach the burning area.

Fire Boss Bawcom requested additional manpower and equipment. From all over Central and Northern California (Southern California was having its own problems with several campaign fires) men and equipment were dispatched to the fire. Fire Camp #2, adjacent to the Rocky Butte Truck Trail, was established during the late afternoon of Monday the 18th. The site selected was 4 miles from the fire.

An estimated 10,000 acres had burned by 8:00 a.m. of the 19th. There was no appreciable lessening of the morning inversion layer. Efforts to tie in the actively burning Tobacco Creek line had failed because of its inaccessibility, the seriously impaired visibility, the precipitous terrain, and the extremely inflammable condition of the vegetation.

During the early evening of the 19th, with erratic gusty winds driving the fire out of Tobacco Creek, the fire swept over the Rocky Butte Truck trail and consumed Fire Camp #2 as it raged by. Injuries to men in camp were limited to a few minor burns but practically everything that would burn was destroyed including a mobile radio repeater, a water truck, blankets, and miscellaneous hand tools.

Since the fire control problem was now totally within the San Luis Obispo Ranger Unit, Ranger Jim Dulitz had assumed Fire Boss responsibilities. By the morning of Wednesday the 20th over 19,000 acres had been burned. Additional assistance was on the fire and on the way. Overhead (experienced leaders) from as far away as Siskiyou County, and Conservation Camp crews as distant as Crystal Creek, nearing Redding, were dispatched into northern San Luis Obispo County by the central dispatcher at Sacramento.

The Division of Forestry had 33 firetrucks and 27 bulldozers engaged, along with about 70 other miscellaneous vehicles. The Army furnished four bulldozers and 19 other pieces of ground equipment. With the six Army helicopters on the fire, the Division hired two helicopters, two observation planes and six air tankers. These tanker planes dropped a total of 47,500 gallons of bentonite solution in 77 air drops.

The U. S. Weather Bureau rolled a mobile forecasting truck unit into the fireline camps in order to offer local and more reliable fire weather predictions.

A third fire camp was established on Town Creek on the east side of the fire. Hearst Corporation had established its own fire camp to supply and service their forces on the northwest side of the fire. Local fire departments contributed assistance. Numerous local ranchers, large and small, had thrown all of their available men and machinery into the struggle. Intimate knowledge of the area by these people was a valuable asset in determining fireline locations. The United States Army assisted greatly by furnishing specialized equipment and as many as 130 men at one time. Their "flying banana" helicopters soon ceased to be just a novelty to the firefighters. They performed amazing work in transportation of men over rough country.

During Wednesday, control efforts continued to be thwarted by extremely diverse wind conditions and difficult terrain. Backfiring operations were successful along the Nacimiento. They contained the northeast sector; however, the fire continued to flank and overrun control lines in the south and west sectors and spilled over into Carroll and McLaughlin Canyon on the southeast and into Vulture Rock and Marmolejo Flats on the west.

Fire Boss Dulitz had 35,000 acres of fire on the morning of the 21st with 70% of the fire perimeter uncontrolled. His was a heavy responsibility. By morning of Friday the 22nd, Fire Camp #4 had been established and there were over a thousand men involved in the suppression effort. By now the entire Nation was aware of this great uncontrolled fire.

The morning of the 23rd saw a perceptible improvement in the weather. Forty-eight thousand acres had burned. However, there was now only 20% open line. The fire had spread to within a mile and a half of the Hearst San Simeon Castle and was checked; control lines were holding, spot fires from backfire operations were being caught and extinguished. Even the zebras on the Hearst Ranch seemed less nervous and appeared only mildly curious about the comings and goings of firefighting equipment, and bands of wild turkeys were assured that preening and admiring themselves was considerably more important than the dwindling fire.

Complete control was obtained at 8:00 a.m. on Monday, July 25, the eighth day of the fire. 49,850 acres had burned, 41,000 acres of which were watershed for the Nacimiento Reservoir; \$60,000 worth of forage was destroyed, and structures and other improvements valued at nearly \$25,000 were burned. This was part of the estimated fire loss, not the suppression cost of - how much? Certainly no less than \$300,000 if all the costs could be gathered.

The Army lost a \$10,000 bulldozer which dropped over a cliff. California Polytechnic College suffered the loss of a tank truck valued at a couple of thousand dollars when it was enveloped and destroyed by fire. Amazingly, there were only about 50 recorded injuries and no deaths due to this fire. One Conservation Camp worker suffered a broken leg when he slipped on loose stones and fell down a steep slope.

Mop-up action continued until August 11. But this was not the end of the Weferling Fire. With the coming winter's rain, completely denuded steep slopes posed a severe threat of sedimentation damage to Nacimiento Reservoir.

An emergency revegetation program required aerial application of grass seeds to approximately 10,000 acres of the most critical watershed.

Again this is not the end of the story of the Weferling Fire. For years to come it will remain in the minds of many people as an outstanding example of the need on everyone's part for more intensive forest fire prevention. If the lesson learned will help prevent a similar fire in the future perhaps some portion of the tremendous expense of suppressing this fire will have been repaid.

EPILOGUE

Management of the Weferling Fire was entirely satisfactory from an organizational standpoint. Fires of this size offer the severest test to any agency. Battle losses are inevitable, just as the twists and turns of the fire enemy are to a great extent unpredictable. This situation is unfortunately true with present elementary (but increasing) knowledge of fire behavior.

Undoubtedly, the condition which most impressed the men on this fire was the phenomenon they often termed "crazy winds". Winds were not exceptionally strong, except perhaps quite locally at times, and that was one of the most baffling manifestations of this intricate complex weather. Temperature was often high, and the humidity was often critically low. Oddly enough, both of these conditions which contribute to erratic and severe fire behavior prevailed almost all night long, during what is normally regarded as the dormant period of a fire. Such conditions are familiar to the California firefighter. However, it was the completely unpredictable nature of the winds that most aggravated the fireline bosses and the fire strategists during this campaign fire. This, in conjunction with much rough terrain covered with dense, highly inflammable vegetation, was the cause of the large proportions of the Weferling fire.

Inversion "blankets", forming during the early morning hours because of cooling of the air layers near the ground, act like a stove damper on fires--causing them to quiet down until late morning hours. These inversions are quite common in the coastal areas. When the sunshine, warming these lower layers of air, raises the air temperature high enough to disrupt the stable inversion "blanket", the effect on the fire is much the same as opening the stove damper. "Dead" fires often spring to life with almost explosive suddenness and energy when some lazily rising updraft of heat from the fire area finally breaches the inversion and begins accelerating upward at increasing speed. This is a moment of great hazard on the fireline.

During the Weferling Fire the inversions were present but were never particularly strong or "stable". The net result was an even more hazardous situation during the morning hours since it did not take much heat to initiate the rapidly rising convection columns and to start the fire on its march again. The pronounced tendency for strong vertical air currents to form, over the fire area, coupled with some surface turbulence caused by cooler ocean air sliding over the main coastal dividing ridge, and with both air sources further confused by every possible complication of channeling and funneling over and down the rough mountains and canyons, completely disrupted any chance of even and predictable air movement. Not only the rising heat of the main fire but also the appreciable heat columns set up by backfires must have compounded the confusion already associated with this Devil's brew of "crazy winds".

This fire thrust upon the Division of Forestry a concept of public relations which will have to be recognized hereafter on most large fires if for no other reason than to remove a great burden from the fire managers. Actually, of course, it is accepted without question that fire news has great fire prevention education value.

The communication traffic from outside became so heavy by the second day that Ranger Unit dispatchers and line officers were obviously headed toward a serious jamb in their own vital communication if something were not done to relieve the situation. Undoubtedly, the proximity of Hearst San Simeon Castle excited a nationwide news interest in this fire. There was further complication in the fact that the Central Coast District suffered a total of 63 other fires during the burning period of Weferling Fire.

On the 18th of July, Associate Ranger Diltz was assigned solely to public information communication. He undertook this first from King City and then he moved to San Luis Obispo headquarters for two days. It was very soon obvious that this was too far from the scene of action so he moved to Fire Camp No. 4 for the remainder of the fire. The P. T. and T. Company gave him a special phone number which he carried with him into the camp by an attachment to the coastwise lines.

A scrutiny of the times and sources of 291 phone calls monitored by Diltz is ample evidence of the absolute necessity of this Public Information Officer service. Practically all of the radio, television and newspaper services along the coast from San Francisco and Oakland to Los Angeles made repeated calls, as did United and Associated Press services. Time and Newsweek magazines were on the phone, and Life sent a man to the fire.

Diltz is confident that most efficiency was gained by one information man handling this job, and furthermore, he could often sleep in the early hours after midnight. His log indicates that such sleep was often interrupted.

It should be further noted that a conducted tour of action spots on the fire for television, radio recorders and news photographers is also a service which should be provided by a knowledgeable guide, not only to assure accurate reporting but to cause a minimum of interference with fire business and the harrassed fire managers.



HOMESTAKE MINE FIRE

HOMESTAKE MINE FIRE

August 20-27, 1960

On August 20, 1960, at 2:05 p.m., a thin trickle of smoke came spiraling out of the canyon of the Middle Fork of the American River. The Amador Air Patrol, on a routine flight in the area, made an immediate report of the fire to the Division Ranger Headquarters at Auburn.



At this time the fire was approximately 1/4 acre in size. Temperature was 96°; relative humidity 6%; fuel moisture 3.0; and wind southeast at 9 miles per hour. Because of extremely steep terrain and lack of access roads, effective initial attack was quite difficult. To further complicate the situation, instead of burning out of the river canyon the fire was spreading parallel to the river and moving up-canyon. After moving in this direction for a half mile or a little more, the fire then started moving up and out of the canyon. During this time, the fire "spotted" south across the Middle Fork of the American River and commenced burning out of the canyon towards Volcanoville. The Eldorado National Forest was notified of the fire and help was requested. Both the Forest Service and the Division crews from Eldorado Unit made initial attack on that southern side of the fire.

By this time, several regular Division crews and Conservation Camp crews were enroute to the fire on the Forest Hill side of the river. State Forest Ranger W. F. "Mike" Brock was on the scene and, realizing a major campaign fire was developing, made plans for moving in more men and equipment and the establishment of a fire camp. Requests for air tankers could not be filled because the Forest Service was using all planes on the Donner Ridge Fire which had started shortly before this Homestake Mine Fire.

At approximately 3:00 p.m., the fire came out of the American River Canyon with a head about a mile wide. When the fire reached the top of the Forest Hill Divide, the existing winds blew it completely out of control. For the next eight hours, the fire spread at a rate of 1,000 acres per hour. The small historical mining town of Bath was directly in the path of the fire, and it was necessary to evacuate all inhabitants of the area. The entire community was destroyed by the flames. The next areas to be threatened were Michigan Bluff and Bakers Ranch. The families in these areas were evacuated as a safety measure. During the night the fire completely surrounded both areas, but only two buildings were lost.



The fire burned to within two feet of the historic Leland Stanford home in Michigan Bluff and then stopped.

By this time manpower from as far south as San Luis Obispo and as far north as Yreka was on the way to the fire. Ten bulldozers were being moved into the area from a road construction job near Marysville. Plans were being made to fight a major battle.

When the fire camp moved into the Forest Hill American Legion picnic grounds, they found that a wedding was scheduled for that evening. Because of the fire danger, the bride and groom transferred the wedding ceremony to Auburn but left the wedding cake for the firefighters.

By the early hours of the 21st, some 10,000 acres had burned including 1,920 acres on the El Dorado County side of the American River. Five homes and numerous other structures had been lost in the vicinity of Bath.

During that night, as men and equipment continued to arrive, plans were made to use existing roads and natural firebreaks to stop the fire in the area between Bakers Ranch and Michigan Bluff.

On the morning of the 21st, the weather as forecast was warm and dry. Southwest winds began blowing early in the morning. During the morning hours, the crews were able to make a little headway in the control of the fire. At 1:30 p.m., fire headquarters received word that the fire, fanned by 40 MPH winds, had jumped the firelines at Michigan Bluff, destroyed two homes, and all hope of holding lines in that area was gone. All efforts to stop the head of the fire were abandoned and crews deployed to fight a flanking action. The fire was now following the path of the disastrous fire of 1937.

About this time, the wind commenced pushing the rear of the fire toward the town of Forest Hill. All residents in the area were alerted for possible evacuation. California Disaster Office fire pumpers were strategically located around the town to protect as many buildings as possible. Crews of the Division and Conservation Camps and local logging crews made a determined stand and stopped the fire at the edge of town.

Manpower and equipment were still being rapidly moved into the area. During this last "run" of the fire, it crossed the "pay protection" boundary and was now burning on the Forest Service side of the line.

By midnight this date, August 21, 1960, the fire had advanced eight airline miles to the vicinity of the Elliott Ranch. Crews in the area were able to save most of the buildings. Fifteen head of cattle, corralled in the area, were also saved but it was necessary to extinguish spot fires in their hides with handfuls of dirt. The head of the fire was now approaching the steep and rugged terrain leading into the canyon of the North Fork of the American River. The acreage at this time was approximately 30,000 acres. Now 1,500 men, 18 California Division of Forestry pumpers, 20 bulldozers, and 20 California Disaster Office plus county and city fire trucks were on the fire line. The Forest Service was now starting to move men and equipment into the area and making plans to establish two new fire camps.

The weather forecast for August 22, 1960, was for slightly lower temperatures, slightly higher humidities, and for winds around 10-20 MPH. Fortunately,

the winds did not develop. This allowed firefighters a chance to construct and hold miles of fireline during the day. The biggest problem of that day was the control and extinguishing of numerous spot fires caused by the advancing fire during the previous night. The main fire moved very little during this period and burned area remained around 30,000 acres. There were 2,000 men, 38 California Division of Forestry and California Disaster Office pumpers, and 36 bulldozers now on the fire lines.

The winds on the 23rd of August were light and variable again allowing for good progress in the establishment of firelines. The fire spotted across the North Fork of the American River during this burning period.

On the northeast corner of the head of the fire, several Conservation Camp crews were assigned the job of constructing and backfiring a line from Westville down into the North Fork Canyon. Because of the extreme steepness of the terrain, it was necessary for the crews to use ropes to make the descent into the canyon. They remained overnight and climbed out the next day. Food and blankets were dropped from helicopters.

During the major advance made by the fire into the Elliott Ranch area, Forestry crews were using the Big Reservoir Lake to fill their fire trucks. On one shore of the lake, a camp was discovered. The camp was complete with tent, cooking equipment, food, clothes, and camp table with 3 half-full cans of beer sitting on it. There was no sign of the occupants and concern was felt over their whereabouts. Two days later the families involved contacted fire camp for permission to return to the area. They explained that the approaching fire had scared them and they had jumped in their car and had left everything - including the beer. They were very pleased when notified that the fire had burned around their camp and all of their belongings were safe.

The southeast part of the fire now became the major problem. Because of gusty winds, the fire had developed many fingers which were burning into very rugged, steep, and inaccessible terrain of the West Branch of El Dorado Canyon. Crews were unable to construct and hold lines, so this area was abandoned and crews moved back to Codfish Point Ridge to try to hold the fire. Five smoke-jumpers were dropped on Codfish Point Ridge to establish heliports for the landing of firefighters needed in the fight to hold the ridge. Adverse wind conditions pushed the fire across the firelines and crews had to again abandon their lines and move back to Deadwood Ridge. By this time the area burned was 34,000 acres. Two thousand and seventy men, 40 fire trucks, 36 bulldozers, and 15 helicopters were being used on the 65 exterior miles of fireline. Men on the fire represented the California Division of Forestry; U. S. Forest Service; 30 Conservation Camp crews; Indian firefighters from the Southwest; military personnel from 5 Air Force bases, one Army base, and the 12th Naval District; California Disaster Office; city and county fire departments, and men from local sawmills and logging operations.

All efforts were being devoted to constructing firelines and plans were being made to hold the fire on Deadwood Ridge. As this area was entirely within the U. S. Forest Service side of the protection boundary, that agency was in charge of the operations. Several Division overhead, Division crews, and Conservation Camp crews were assigned to the task of stopping the fire on Deadwood Ridge.

At 1:00 a.m. on August 27, a seven mile backfire was started on Deadwood Ridge. Crews worked all night to complete the firing before the arrival of

daylight hours. At 6:00 a.m. the job was completed and the men prepared to hold the lines during the approaching burning period. Weather finally gave the crews a break - no winds developed during the day - and the fire was declared controlled at 12:01 p.m. August 27. Final acreage: 44,551 acres. Damage to structures and timber was estimated in excess of 1/2 million dollars.

While this major job of controlling the fire was in progress, investigators from the California Division of Forestry, U. S. Forest Service, and Placer County Sheriff's Office had started their job of fire investigation.

The 1/4 acre fire as observed by the aerial patrol was marked out on the ground and possible suspects who had been in the area were returned to the scene and asked to account for their movements during the day the fire started. After further investigation it was determined that the most logical cause of the fire was a discarded cigarette by one of the juveniles who had been in the area on August 20.

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"Proceedings - 75th Anniversary Commemorative Extraordinary Session - Calif. State Board of Forestry" 35 pp, proc. CDF

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"Cattle Feeding Trials Using a Pelleted Brush Roughage" by Paul B. Furbush, Charles E. Carlson, and Norman J. Dal Porto, Range Improvement Studies No. 4, 13 pp, proc, CDF.

"The Dal Tool" by Norman J. Dal Porto, Range Improvement Studies No. 5, 4 pp, proc, CDF. (See also p 11, Amer. Tree Farmer, Feb. 1961)

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